Eating Disorder Risk Factors and the Impact of Obesity in Patients With Psoriasis

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PRACTICE **POINTS**

- Eating disorders are considered a contributing factor in obesity.
- Obesity is prevalent in patients with psoriasis, and current evidence indicates that obesity may initiate psoriasis or worsen existing disease.
- Obesity should be considered as contributory to the development of psoriasis via a biopsychosocial approach that accounts for genetic, behavioral, and environmental factors.

Current evidence indicates that obesity may initiate psoriasis or worsen existing disease. Various factors contribute to the development of obesity, including eating disorders (EDs). The aim of this study was to screen for and identify factors associated with EDs in patients with psoriasis and their impact on the development of obesity in this population. Demographic information including body mass index (BMI), Eating Attitude Test (EAT-26), Dermatology Life Quality Index (DLQI), Attitude Scale for Healthy Nutrition (ASHN), and Depression Anxiety Stress Scale 21 (DASS-21) scores were statistically analyzed for 82 participants with psoriasis at a tertiary dermatology clinic. It is important to manage obesity and other comorbidities of psoriasis in addition to treating its cutaneous manifestations, which may require a biopsychosocial approach.

Psoriasis is a chronic multisystemic inflammatory skin disease with a worldwide prevalence of 2% to 3%.[1] Psoriasis can be accompanied by other conditions such as psoriatic arthritis, obesity, metabolic syndrome, diabetes mellitus, hypertension, dyslipidemia, atherosclerotic disease, inflammatory bowel disease, and anxiety/depression. It is important to manage comorbidities of psoriasis in addition to treating the cutaneous manifestations of the disease.[1]

Obesity is a major public health concern worldwide. Numerous observational and epidemiologic studies have reported a high prevalence of obesity among patients with psoriasis.[2] Current evidence indicates that obesity may initiate or worsen psoriasis; furthermore, it is important to note that obesity may negatively impact the effectiveness of psoriasis-specific treatments or increase the incidence of adverse effects. Therefore, managing obesity is crucial in the treatment of psoriasis.[3] Numerous studies have investigated the association between psoriasis and obesity, and they commonly conclude that both conditions share the same genetic metabolic pathways.[2-4] However, it is important to consider environmental factors such as dietary habits, smoking, alcohol consumption, and a sedentary lifestyle—all of which are associated with psoriasis and also can contribute to the development of obesity.[5] Because of the effects of obesity in psoriasis patients, factors that impact the development of obesity have become a popular research topic.

Eating disorders (EDs) are a crucial risk factor for both developing and maintaining obesity. In particular, two EDs that are associated with obesity include binge eating disorder and bulimia nervosa.[6] According to the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*,[7] binge eating disorder can be diagnosed when a patient has at least 1 episode of binge eating per week over a 3-month period. Bulimia nervosa can be diagnosed when a patient is excessively concerned with their body weight and shape and engages in behaviors to prevent weight gain (eg, forced vomiting, excessive use

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of laxatives).[7] Psychiatrists who specialize in EDs make diagnoses based on these criteria. In daily practice, there are several quick and simple questionnaires available to screen for EDs that can be used by nonpsychiatrist physicians, including the commonly used 26-item Eating Attitudes Test (EAT-26).[8] The EAT-26 has been used to screen for EDs in patients with inflammatory disorders.[9]

The aim of this study was to screen for EDs in patients with psoriasis to identify potential risk factors for development of obesity.

Materials and Methods

This study included patients with psoriasis who were screened for EDs at a tertiary dermatology clinic in Turkey between January 2021 and December 2023. This study was approved by the local ethics committee and was in accordance with the Declaration of Helsinki (decision number E-93471371-514.99-225000079).

Study Design and Patient Inclusion Criteria—This quantitative cross-sectional study utilized EAT-26, Dermatology Life Quality Index (DLQI), Attitude Scale for Healthy Nutrition (ASHN), and Depression Anxiety Stress Scale-21 (DASS-21) scores. All the questionnaire scales used in the study were adapted and validated in Turkey.[8,10-12] The inclusion criteria consisted of being older than 18 years of age, being literate, having psoriasis for at least 1 year that was not treated topically or systemically, and having no psychiatric diseases outside an ED. The questionnaires were presented in written format following the clinical examination. Literacy was an inclusion criterion in this study due to the absence of auxiliary health personnel.

Study Variables—The study variables included age, sex, marital status (single/divorced or married), education status (primary/secondary school or high school/university), employment status (employed or unemployed/retired), body mass index (BMI), smoking status, alcohol-consumption status, Psoriasis Area Severity Index score, presence of nail psoriasis and psoriatic arthritis, duration of psoriasis, family history of psoriasis, EAT-26 score, ASHN score, DLQI score, and DASS-21 score. Body mass index was calculated by taking a participant's weight in kilograms and dividing it by their height in meters squared. The BMI values were classified into 3 categories: normal (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2), and obese (≥30 kg/m^2).[13]

Questionnaires—The EAT-26 questionnaire includes 26 questions that are used to detect EDs. Responses to each question include Likert-type answer options (ie, "always," "usually," "often," "sometimes," "rarely," and "never.") Patients with scores of 20 points or higher (range, 0–78) are classified as high risk for EDs.[8] In our study, EAT-26 scores were grouped into 2 categories: patients scoring less than 20 points and those scoring 20 points or higher.

The DLQI questionnaire includes 10 questions to measure dermatologic symptoms and qualiy of life. Responses to each question include Likert-type answer options (ie, "not at all," "a little," "a lot," or "very much.") On the DLQI scale, the higher the score, the lower the quality of life (score range, 0–30).[10]

The ASHN questionnaire includes 21 questions that measure attitudes toward healthy nutrition with 5 possible answer options ("strongly disagree," "disagree," "undecided," "agree," and "strongly agree"). On this scale, higher scores indicate the participant is more knowledgeable about healthy nutrition (score range, 0–78).[11]

The DASS-21 questionnaire includes 21 questions that measure the severity of a range of symptoms common to depression, anxiety, and stress. Responses include Likert-type answer options (eg, "never," "sometimes," "often," and "almost always.") On this scale, a higher score (range of 0–21 for each) indicates higher levels of depression, anxiety, and stress.[12]

Statistical Analysis—Descriptive statistics were analyzed using SPSS software version 22.0 (IBM). The Shapiro-Wilk test was applied to determine whether the data were normally distributed. For categorical variables, frequency differences among groups were compared using the Pearson χ^2 test. A *t* test was used to compare the means of 2 independent groups with a normal distribution. One-way analysis of variance and Tukey Honest Significant Difference post hoc analysis were used to test whether there was a statistically significant difference among the normally distributed means of independent groups. Pearson correlation analysis was used to determine whether there was a linear relationship between 2 numeric measurements and, if so, to determine the direction and severity of this relationship. $P<.05$ indicated statistical significance in this study.

Results

Study Participant Demographics—This study included 82 participants with a mean age of 44.3 years; 52.4% (43/82) were female, and 85.4% (70/82) were married. The questionnaire took an average of 4.2 minutes for participants to complete. A total of 57.3% (47/82) of patients had completed primary/secondary education and 59.8% (49/82) were employed. The mean BMI was 28.1 kg/m^2. According to the BMI classification, 26.8% (22/82) participants had a normal weight, 36.6% (30/82) were overweight, and 43.9% (36/82) were obese. A total of 48.8% (40/82) of participants smoked, and 4.9% (4/82) consumed alcohol. The mean Psoriasis Area and Severity Index score was 5.4. A total of 54.9% (45/82) of participants had nail psoriasis, and 24.4% (20/82) had psoriatic arthritis. The mean duration of psoriasis was 153 months. A total of 29.3% (24/82) of participants had a positive family history of psoriasis. The mean EAT-26 score was 11.1. A total of 12.2% (10/82) of participants had an EAT-26 score of 20 points or higher and were considered at high risk for an ED. The mean ASHN score was 72.9; the mean DLQI score was 5.5; and on the DASS-21 scale, mean scores for depression, anxiety, and stress were 6.3, 8.7, and 10.0, respectively (Table).

TABLE. Study Participant Demographics

Characteristic	Patients (N=82)
Mean age (SD), y	44.3 (14.6)
Sex, n (%)	
Male	43 (52.4)
Female	39 (47.6)
Marital status, n (%)	
Single/divorced	12 (14.6)
Married	70 (85.4)
Education status, n (%)	
Primary/secondary school	47 (57.3)
High school/university	35 (42.7)
Employment status, n (%)	
Employed	49 (59.8)
Unemployed/retired	33 (40.2)
Mean BMI, kg/m^2	28.1
BMI groups, n (%)	
Normal (<25 kg/m^2)	22 (26.8)
Overweight (25–29.9 kg/m^2)	30 (36.6)
Obese (≥30 kg/m^2)	30 (36.6)
Positive smoking status, n (%)	40 (48.8)
Positive alcohol consumption status, n (%)	4 (4.9)
Mean PASI score	5.4
Presence of nail psoriasis, n (%)	45 (54.9)
Presence of psoriatic arthritis, n (%)	20 (24.4)
Mean duration of psoriasis, mo	153
Positive family history, n (%)	24 (29.3)
Mean EAT-26 score	11.1
EAT-26 score, n (%)	
<20	72 (87.8)
≥20	10 (12.2)
Mean ASHN score	72.9
Mean DLQI score	5.5
Mean DASS-21 score	
Depression	6.3
Anxiety	8.7
Stress	10

Abbreviations: ASHN, Attitude Scale for Healthy Nutrition; BMI, body mass index; DASS, Depression, Anxiety, Stress Score; DLQI, Dermatology Life Quality Index; EAT, Eating Attitude Test; PASI, Psoriasis Area and Severity Index.

Comparative Evaluation of the BMI Groups—The only statistically significant differences among the 3 BMI groups were related to marital status, EAT-26 score, and anxiety and stress scores (P=.02, <.01, <.01, and <.01, respectively)(eTable 1). The number of single/divorced participants in the overweight group was significantly (P=.02) greater than in the normal weight group. The mean EAT-26 score for the normal weight group was significantly (P<.01) lower than for the overweight and obese groups; there was no significant difference in mean EAT-26 scores between the overweight and obese groups. The mean anxiety score was significantly (P<.01) lower in the normal weight group compared with the overweight and obese groups. There was no significant difference between the overweight and obese groups according to the mean depression score. The mean stress and anxiety scores were significantly (P<.01) lower in the normal weight group than in the overweight and obese groups. There was no significant difference between the overweight and obese groups according to the mean anxiety score.

Comparative Evaluation of the EAT-26 Scores—There were statistically significant differences among the EAT-26 scores related to sex; BMI; and depression, anxiety, and stress scores (P=.04, .02, <.01, <.01, and <.01, respectively). The number of females in the group with a score of 20 points or higher was significantly (P=.04) less than that in the group scoring less than 20 points. The mean BMI in the group with a score of 20 points or higher was significantly (P=.02) greater than in group scoring less than 20 points. The mean depression, anxiety, and stress scores of the group scoring 20 points or higher were significantly (P<.01 for all) greater than in the group scoring less than 20 points (eTable 2).

Correlation Analysis of the Study Variables—The EAT-26 scores were positively correlated with BMI, anxiety, depression, and stress (P<.01 for all)(eTable 3).

Comment

Eating disorders are psychiatric conditions that require a multidisciplinary approach. Nonpsychiatric medical departments may be involved due to the severe consequences (eg, various skin changes[14]) of these disorders. Psoriasis is not known to be directly affected by the presence of an ED; however, it is possible that EDs could indirectly affect patients with psoriasis by influencing obesity. Therefore, this study aimed to examine the relationship between ED risk factors and obesity in this population.

The relationship between psoriasis and obesity has been a popular research topic in dermatology since the 1990s.[15] Epidemiologic and observational studies have reported that patients with psoriasis are more likely to be overweight or have obesity, which is an independent risk factor for psoriasis.[3,16] However, the causal relationship between psoriasis and obesity remains unclear. In a comprehensive review, Barros et al[17] emphasized the causal relationship between obesity and psoriasis under

several headings. Firstly, a higher BMI increases the risk for psoriasis by promoting cytokine release and immune system dysregulation. Secondly, a Western diet (eg, processed foods and fast food) triggers obesity and psoriasis by increasing adipose tissue. Thirdly, the alteration of the skin and gut microbiota triggers chronic inflammation as a result of bacterial translocation in patients with obesity. Fourthly, a high-fat diet and palmitic acid disrupt the intestinal integrity of the gut and increase the risk for psoriasis and obesity by triggering chronic inflammation of bacterial fragments that pass into the blood. Finally, the decrease in the amount of adiponectin and the increase in the amount of leptin in patients with obesity may cause psoriasis by increasing proinflammatory cytokines, which are similar to those involved in the pathogenesis of psoriasis.[17] Additionally, psoriatic inflammation can cause insulin resistance and metabolic dysfunction, leading to obesity.[18] The relationship between psoriasis and obesity cannot be solely explained by metabolic pathways. Smoking, alcohol consumption, and a sedentary lifestyle all are associated with psoriasis and also can contribute to obesity.[5] Our study revealed no significant difference in smoking or alcohol consumption between the normal weight and overweight/obesity groups. Based on our data, we determined that smoking and alcohol consumption did not affect obesity in our patients with psoriasis.

Observational and epidemiologic studies have shown that patients with psoriasis experience increased rates of depression, anxiety, and stress.[19] In studies of pathogenesis, a connection between depression and psoriatic inflammation has been established.[20] It is known that inflammatory cytokines similar to those in psoriasis are involved in the development of obesity.[18] In addition, depression and anxiety can lead to binge eating, unhealthy food choices, and a more sedentary lifestyle.[5] All of these variables may contribute to the associations between depression and anxiety with psoriasis and obesity. Zafiriou et al[21] conducted a study to investigate the relationship between psoriasis, obesity, and depression through inflammatory pathways with a focus on the importance of IL-17. Data showing that IL-17–producing Th17-cell subgroups play a considerable role in the development of obesity and depression prompted the authors to suggest that psoriasis, obesity, and anxiety/depression may be interconnected manifestations of immune dysregulation, potentially linked to IL-17 and its associated cells.[21] Mrowietz et al[22] also suggested that metabolic inflammation may contribute to obesity and depression in patients with psoriasis and highlighted the importance of several cytokines, including tumor necrosis factor α, IL-6, IL-8, IL-17, and IL-23. Our study revealed no significant differences in depression scores between BMI groups. Another meta-analysis reported conflicting findings on the incidence of depression in obese patients with psoriasis.[23] Some of the studies had a small number of participants. Compared to depression, anxiety has received less attention in studies of patients with obesity with psoriasis. However, these studies have shown a positive correlation between anxiety scores and BMI in patients with psoriasis.[24,25] In our study, similar to the findings of previous studies, overweight patients and those with obesity who have psoriasis had significantly ($P<.01$) greater anxiety and stress scores than did normal weight patients with psoriasis.

Obesity should be assessed in patients with psoriasis via a biopsychosocial approach that takes into account genetic, behavioral, and environmental factors.[26] Eating disorders are considered to be one of the factors contributing to obesity. Numerous studies in the literature have demonstrated a greater incidence of EDs in patients with obesity vs those without obesity.[5,6,27] Obesity and EDs have a bidirectional relationship: individuals with obesity are at risk for EDs due to body dissatisfaction, dieting habits, and depressive states. Conversely, poor eating behaviors in individuals with a normal weight can lead to obesity.[28]

There are few studies in the literature exploring the relationship between psoriasis and EDs. Crosta et al[29] demonstrated that patients with psoriasis had impaired results on ED screening tests and that these scores deteriorated further as BMI increased. Moreover, Altunay et al[30] demonstrated that patients with psoriasis and metabolic syndrome had higher scores on the ED screening test. In this study, patients with higher scores also exhibited high levels of anxiety.[30] In our study, similar to the findings of previous studies, patients with psoriasis who were overweight or had obesity had significantly ($P<.01$) greater EAT-26 scores than those in the normal weight group. Patients with high EAT-26 scores also exhibited elevated levels of depression, anxiety, and stress. Additionally, EAT-26 scores were positively correlated with BMI, anxiety, depression, and stress scores. Our study as well as other studies in the literature indicate that additional research is needed to determine the associations between EDs and obesity in psoriasis.

Conclusion

Managing obesity is crucial for patients with psoriasis. This study showed that EAT-26 scores were higher in patients with psoriasis who were overweight or had obesity than in those who were normal weight. Participants with high EAT-26 scores (≥20 points) were more likely to be female and have higher anxiety and stress scores. In addition, EAT-26 scores were positively correlated with BMI as well as depression, anxiety, and stress scores. Eating disorders may contribute to the development of obesity in patients with psoriasis. Although our study was limited by a small sample size, the results suggest that there is a need for large-scale multicenter studies to investigate the relationship between psoriasis and EDs.

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eTABLE 1. Comparison of BMI Group Demographics

Characteristic	Normal (n=22)	Overweight (n=30)	Obese (n=30)	Total (N=82)	*P* value
Mean age (SD), y	44.7 (18.3)	43.4 (13.0)	45.0 (13.5)	44.3 (14.6)	.9[a]
Sex, n (%)					.13[b]
Male	15 (34.9)	16 (37.2)	12 (27.9)	43 (100.0)	
Female	7 (17.9)	14 (35.9)	18 (46.2)	39 (100.0)	
Marital status, n (%)					.02[b]
Single/divorced	0 (0.0)	8 (66.7)	4 (33.3)	70 (100.0)	
Married	21 (31.4)	22 (31.4)	26 (37.1)	12 (100.0)	
Educational status, n (%)					.92[b]
Primary/secondary school	12 (25.5)	17 (36.2)	18 (38.3)	47 (100.0)	
High school/university	10 (28.6)	13 (37.1)	12 (34.3)	35 (100.0)	
Occupation, n (%)					.42[b]
Employed	14 (28.6)	16 (32.7)	19 (38.8)	49 (100.0)	
Unemployed/retired	8 (25.0)	14 (43.8)	11 (34.4)	32 (100.0)	
Mean BMI, kg/m^2	22.8	27.0	32.9	28.1	<.01[a]
Positive smoking status, n (%)	11 (27.5)	14 (35.0)	15 (37.5)	40 (100.0)	.95[b]
Positive alcohol consumption status, n (%)	2 (50.0)	1 (25.0)	1 (25.0)	4 (100.0)	.56[b]
Mean PASI score	5.5	4.3	6.4	5.4	.57[a]
Presence of nail psoriasis, n (%)	12 (26.7)	14 (31.1)	19 (42.2)	45 (100.0)	.43[b]
Presence of psoriatic arthritis, n (%)	4 (20.0)	9 (45.0)	7 (35.0)	20 (100.0)	.61[b]
Mean duration of psoriasis, mo	173.7	154.8	136.0	153.0	.5[a]
Positive family history of psoriasis, n (%)	6 (25.0)	8 (33.0)	10 (41.7)	24 (100.0)	.82[b]
Mean EAT-26 score	5.95	11.8	14.4	11.1	<.01[a]
Mean ASHN score	74.9	74.0	70.0	72.9	.3[a]
Mean DLQI score	4.4	5.7	6.2	5.5	.6[a]

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eTABLE 1. (continued)

Characteristic	Normal (n=22)	Overweight (n=30)	Obese (n=30)	Total (N=82)	*P* value
Mean DASS-21 score					
Depression	5.8	6.8	6.3	6.3	.5[a]
Anxiety	5.8	9.8	9.8	8.7	<.01
Stress	6.6	11.2	11.4	10.0	<.01[a]

Abbreviations: ANOVA, analysis of variance; ASHN, Attitude Scale for Healthy Nutrition; BMI, body mass index; DASS, Depression, Anxiety, Stress Score; DLQI, Dermatology Life Quality Index; EAT, Eating Attitude Test; PASI, Psoriasis Area Severity Index.

[a]One-way ANOVA test.

[b]$\chi 2$ test.

eTABLE 2. Comparison of EAT-26 Score Demographics

	EAT-26 score of <20 points (n=72)	EAT score of ≥20 points (n=10)	Patients (N=82)	*P* value
Mean age (SD), y	44.5 (14.6)	42.7 (15.7)	44.3 (14.6)	.7
Sex, n (%)				.04[a]
Male	42 (97.7)	1 (2.3)	43 (100.0)	
Female	30 (76.9)	9 (23.1)	39 (100.0)	
Marital status, n (%)				.9[a]
Single/divorced	61 (87.1)	9 (12.9)	70 (100.0)	
Married	11 (91.7)	1 (8.3)	12 (100.0)	
Educational status, n (%)				.9[a]
Primary/secondary school	41 (56.9)	31 (43.1)	72 (100.0)	
High school/university	6 (60.0)	4 (40.0)	10 (100.0)	
Occupation, n (%)				.3[a]
Employed	30 (42.3)	41 (57.7)	71 (100.0)	
Unemployed/retired	2 (20.0)	8 (80.0)	10 (100.0)	
Mean BMI, kg/m^2	27.5	32.0	28.1	.02
Positive smoking status, n (%)	34 (85.0)	6 (15.0)	40 (100.0)	.5[a]
Positive alcohol consumption status, n (%)	3 (75.0)	1 (25.0)	4 (100.0)	.4[a]
Mean PASI score	5.86	3.24	5.40	.2
Presence nail psoriasis, n (%)	39 (86.7)	6 (13.3)	45 (100.0)	.9[a]
Presence of psoriatic arthritis, n (%)	15 (75.0)	5 (25.0)	20 (100.0)	.7[a]
Mean duration of psoriasis, mo	154.6	141.6	153.0	.7
Positive family history of psoriasis, n (%)	18 (75.0)	6 (25.0)	24 (100.0)	.7[a]
Mean EAT-26 score	9.7	20.8	11.1	<.01
Mean ASHN score	72.9	72.9	72.9	.9
Mean DLQI score	5.8	5.2	5.5	.7

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eTABLE 2. (continued)

	EAT-26 score of <20 points (n=72)	EAT score of ≥20 points (n=10)	Patients (N=82)	*P* value
Mean DASS-21 score				
Depression	6.4	8.9	6.3	.03
Anxiety	8.5	14.3	8.7	<.01
Stress	9.7	15.7	10.0	<.01

Abbreviations: ASHN, Attitude Scale for Healthy Nutrition; BMI, body mass index; DASS, Depression, Anxiety, Stress Score; DLQI, Dermatology Life Quality Index; EAT, Eating Attitude Test; PASI, Psoriasis Area and Severity Index.

[a]χ^2 test.

[b]*t* test.

eTABLE 3. Correlation Analysis of Study Variables With EAT-26 Score

		BMI	PASI score	DLQI score	ASHN score	Anxiety	Depression	Stress
EAT-26 score	Pearson correlation	0.409	0.013	0.200	−0.093	0.695	0.405	0.645
	P value	<.01	.906	.072	.405	<.01	<.01	<.01

Abbreviations: ASHN, Attitude Scale for Healthy Nutrition; BMI, body mass index; DLQI, Dermatology Life Quality Index; EAT, Eating Attitude Test; PASI, Psoriasis Area Severity Index.